Claims;

1. An ink-jet recording sheet comprising;

a support; and a porous layer including fine particles and a binder containing a polymer compound crosslinked through side chains of the polymer on the support,

wherein the crosslinked polymer compound is formed the crosslink by irradiating ionizing radiation to a hydrophilic polymer compound which has a polymerization degree of not less than 300 and a plurality of side chains on a main chain of the hydrophilic polymer compound.

2. The ink jet recording sheet of claim 1, wherein a weight ratio of the fine particles to the binder in the porous layer is from 2 : 1 to 50 : 1.

3. The ink jet recording sheet of claim 1, wherein the weight ratio of the fine particles to the binder in the porous layer is from 6 : 1 to 15 : 1.

4. The ink jet recording sheet of claim 1, wherein the porous layer includes a multivalent metal compound.

5. The ink jet recording sheet of claim 1, wherein a diameter of fine particles is from 0.005 to 0.4 μm.

6. The ink-jet recording sheet of claim 1, wherein the hydrophilic polymer compound has a photosensitive group capable of dimerization by the ionizing radiation, on the side chains.

7. A producing method of an ink-jet recording sheet comprising steps of:

providing on a support a layer including fine particles and a binder containing hydrophilic polymer compound which has plural side chains on a main chain thereof and a polymerization degree of not less than 300; and

irradiating ionized radiation to the polymer compound to form crosslinking through the side chains to form a porous layer.

8. The producing method of an ink-jet recording sheet of claim 7, wherein a weight ratio of the fine particles to the binder containing the polymer compound formed by the crosslinking through the side chains is from 2 : 1 to 50 : 1.

9. The producing method of an ink-jet recording sheet of claim 7, wherein a weight ratio of the fine particles to the binder containing the polymer compound formed by the crosslinking through the side chains is from 6 : 1 to 15 : 1.

10. The producing method of an ink-jet recording sheet of claim 7, wherein the porous layer includes a multivalent metal compound.

11. The producing method of an ink-jet recording sheet of claim 7, wherein a diameter of the fine particles is from 0.005 μm to 0.4 μm.

12. The producing method of an ink-jet recording sheet of claim 7, wherein the hydrophilic polymer compound has a photosensitive group capable of dimerization by the ionizing radiation, on the side chains.

13. The producing method of an ink-jet recording sheet of claim 7, wherein the porous layer is formed by coating a coating composition comprising the fine particles and the hydrophilic polymer compound which has plural side chains on the main chain thereof and a polymerization degree of not

less than 300, and irradiating an ionizing radiation to the polymer compound in the coated layer to form the crosslink between the side chains.

14. The producing method of an ink-jet recording sheet of claim 13, wherein the irradiation of the ionizing radiation is applied at a time in which the weight ratio of solvent to the solid component in the coated layer is not less than 100%.

15. The producing method of an ink-jet recording sheet of claim 13, wherein the polymer compound in the coated layer is irradiated the ionizing radiation so that the elastic modulus of the coated layer after the irradiation is not less than 1.5 times of that of the coated layer before the irradiation and the viscosity coefficient of the coated layer after the irradiation is not less than 1.5 times of that of the coated layer before the irradiation.

16. The producing method of an ink-jet recording sheet of claim 14, wherein the irradiation of the ionizing radiation is further applied at a time in which the weight ratio of

solvent to the solid component in the coated layer is less than 100%.

17. The producing method of an ink-jet recording sheet of claim 13, wherein the coated layer is dried after the irradiation, in atmosphere at a temperature higher not less than 10 °C than that before the irradiation.

18. The producing method of an ink-jet recording sheet of claim 13, wherein after the coated layer is dried, the coated layer is stood for not less than 24 hours in atmosphere at a temperature of not less than 30 °C.

19. The producing method of an ink-jet recording sheet of claim 7, wherein the ionizing radiation is ultraviolet ray.